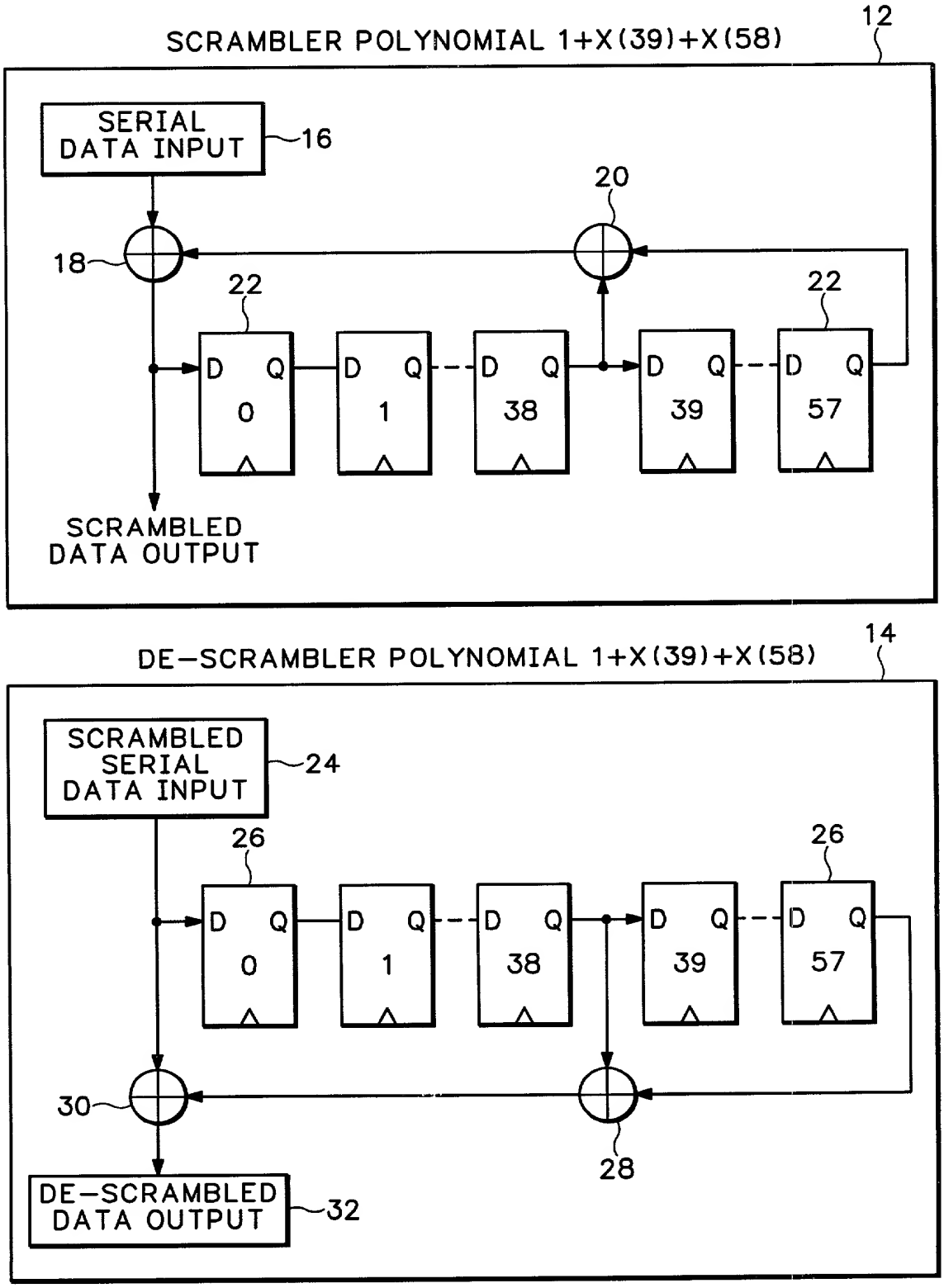


FIG.1
(PRIOR ART)

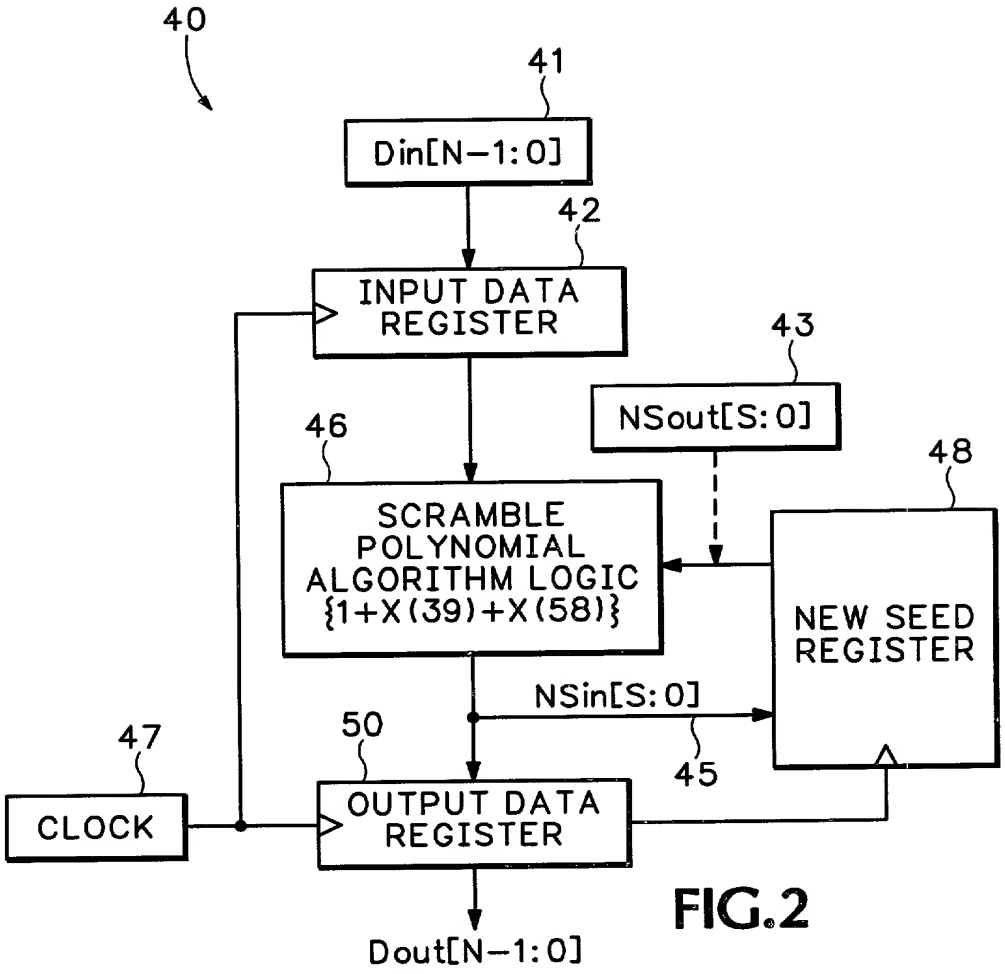

40
41
Din[N−1:0]
42
INPUT DATA REGISTER
43
NSout[S:0]
46
SCRAMBLE POLYNOMIAL ALGORITHM LOGIC {1+X(39)+X(58)}
48
NEW SEED REGISTER
NSin[S:0]
45
47
CLOCK
50
OUTPUT DATA REGISTER
Dout[N−1:0]

FIG.2

NEW SEEDS

```
Ignored
ignored
ignored
ignored
ignored
ignored
Dout(6)=>NS'(57);
Dout(7)=>NS'(56);
Dout(8)=>NS'(55);
Dout(9)=>NS'(54);
Dout(10)=>NS'(53);
Dout(11)=>NS'(52);
Dout(12)=>NS'(51);
Dout(13)=>NS'(50);
Dout(14)=>NS'(49);
Dout(15)=>NS'(48);
Dout(16)=>NS'(47);
Dout(17)=>NS'(46);
Dout(18)=>NS'(45);
Dout(19)=>NS'(44);
Dout(20)=>NS'(43);
Dout(21)=>NS'(42);
Dout(22)=>NS'(41);
Dout(23)=>NS'(40);
Dout(24)=>NS'(39);
Dout(25)=>NS'(38);
Dout(26)=>NS'(37);
Dout(27)=>NS'(36);
Dout(28)=>NS'(35);
Dout(29)=>NS'(34);
Dout(30)=>NS'(33);
Dout(31)=>NS'(32);
Dout(32)=>NS'(31);
Dout(33)=>NS'(30);
Dout(34)=>NS'(29);
Dout(35)=>NS'(28);
Dout(36)=>NS'(27);
Dout(37)=>NS'(26);
Dout(38)=>NS'(25);
Dout(39)=>NS'(24);
Dout(40)=>NS'(23);
Dout(41)=>NS'(22);
Dout(42)=>NS'(21);
Dout(43)=>NS'(20);
Dout(44)=>NS'(19);
Dout(45)=>NS'(18);
Dout(46)=>NS'(17);
Dout(47)=>NS'(16);
Dout(48)=>NS'(15);
Dout(49)=>NS'(14);
Dout(50)=>NS'(13);
Dout(51)=>NS'(12);

Dout(52)=>NS'(11);
Dout(53)=>NS'(10);
Dout(54)=>NS'(9);
Dout(55)=>NS'(8);
Dout(56)=>NS'(7);
Dout(57)=>NS'(6);

Dout(58)=>NS'(5);
Dout(59)=>NS'(4);
Dout(60)=>NS'(3);
Dout(61)=>NS'(2);
Dout(62)=>NS'(1);
Dout(63)=>NS'(0);
```

FIG.3

SCAMBLER POLYNOMIAL
OF 1+X(39)+X(58)

```
Dout[0:38]=NS[38:0]^NS[57:19]^Din[0:38];
Dout(0)=NS(38)^NS(57)^Din(0);
Dout(1)=NS(37)^NS(56)^Din(1);
Dout(2)=NS(36)^NS(55)^Din(2);
Dout(3)=NS(35)^NS(54)^Din(3);
Dout(4)=NS(34)^NS(53)^Din(4);
Dout(5)=NS(33)^NS(52)^Din(5);
Dout(6)=NS(32)^NS(51)^Din(6);
Dout(7)=NS(31)^NS(50)^Din(7);
Dout(8)=NS(30)^NS(49)^Din(8);
Dout(9)=NS(29)^NS(48)^Din(9);
Dout(10)=NS(28)^NS(47)^Din(10);
Dout(11)=NS(27)^NS(46)^Din(11);
Dout(12)=NS(26)^NS(45)^Din(12);
Dout(13)=NS(25)^NS(44)^Din(13);
Dout(14)=NS(24)^NS(43)^Din(14);
Dout(15)=NS(23)^NS(42)^Din(15);
Dout(16)=NS(22)^NS(41)^Din(16);
Dout(17)=NS(21)^NS(40)^Din(17);
Dout(18)=NS(20)^NS(39)^Din(18);
Dout(19)=NS(19)^NS(38)^Din(19);
Dout(20)=NS(18)^NS(37)^Din(20);
Dout(21)=NS(17)^NS(36)^Din(21);
Dout(22)=NS(16)^NS(35)^Din(22);
Dout(23)=NS(15)^NS(34)^Din(23);
Dout(24)=NS(14)^NS(33)^Din(24);
Dout(25)=NS(13)^NS(32)^Din(25);
Dout(26)=NS(12)^NS(31)^Din(26);
Dout(27)=NS(11)^NS(30)^Din(27);
Dout(28)=NS(10)^NS(29)^Din(28);
Dout(29)=NS(9)^NS(28)^Din(29);
Dout(30)=NS(8)^NS(27)^Din(30);
Dout(31)=NS(7)^NS(26)^Din(31);
Dout(32)=NS(6)^NS(25)^Din(32);
Dout(33)=NS(5)^NS(24)^Din(33);
Dout(34)=NS(4)^NS(23)^Din(34);
Dout(35)=NS(3)^NS(22)^Din(35);
Dout(36)=NS(2)^NS(21)^Din(36);
Dout(37)=NS(1)^NS(20)^Din(37);
Dout(38)=NS(0)^NS(19)^Din(38);
```

FIG.4

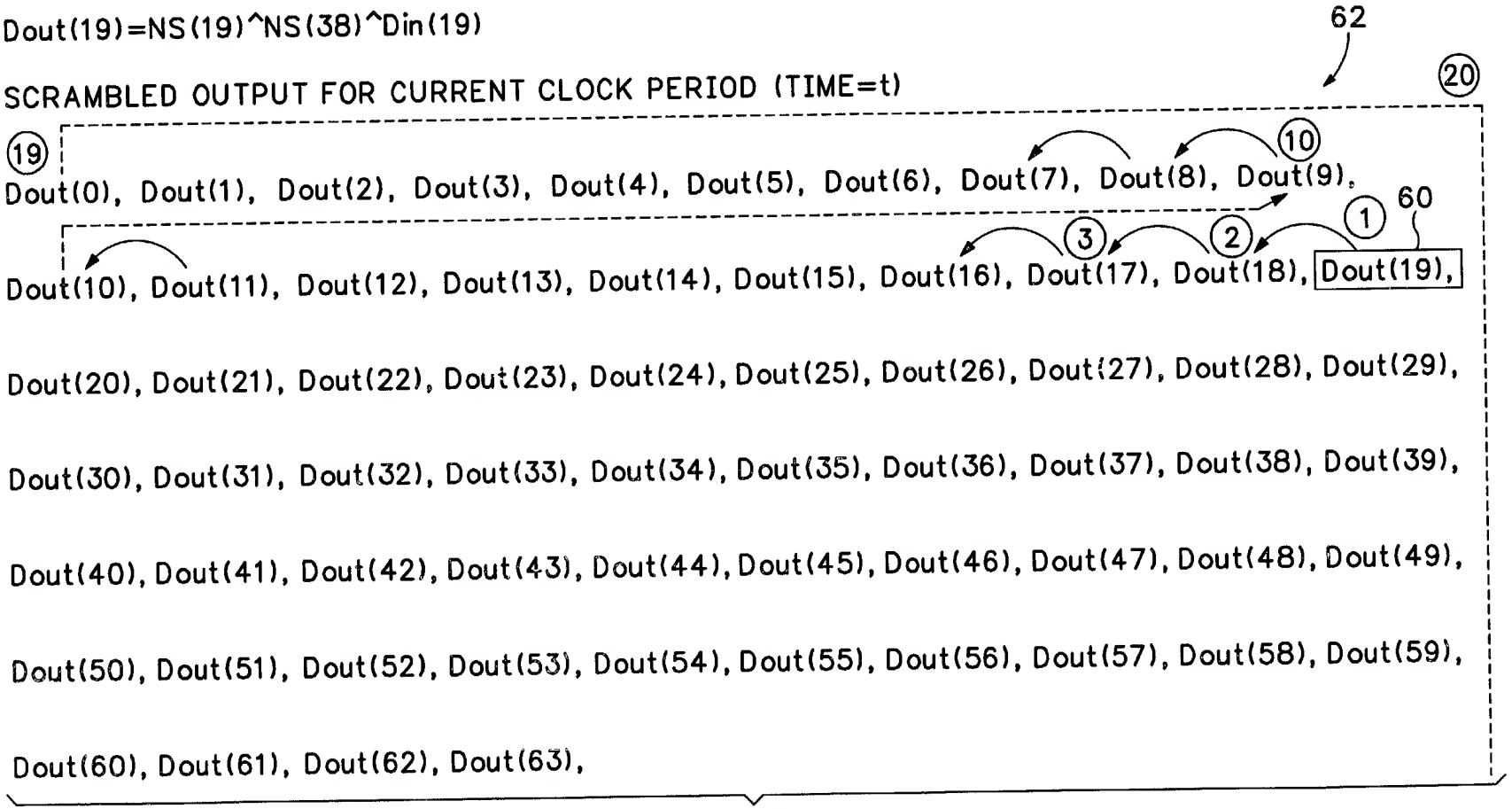
```
Dout[39:57]=NS[18:0]^NS[38:20]^NS[57:39]^Din[0:18]^Din[39:57];
Dout(39)=NS(18)^NS(38)^NS(57)^Din(0)^Din(39);
Dout(40)=NS(17)^NS(37)^NS(56)^Din(1)^Din(40);
Dout(41)=NS(16)^NS(36)^NS(55)^Din(2)^Din(41);
Dout(42)=NS15)^NS(35)^NS(54)^Din(3)^Din(42);
Dout(43)=NS(14)^NS(34)^NS(53)^Din(4)^Din(43);
Dout(44)=NS(13)^NS(33)^NS(52)^Din(5)^Din(44);
Dout(45)=NS(12)^NS(32)^NS(51)^Din(6)^Din(45);
Dout(46)=NS(11)^NS(31)^NS(50)^Din(7)^Din(46);
Dout(47)=NS(10)^NS(30)^NS(49)^Din(8)^Din(47);
Dout(48)=NS(9)^NS(29)^NS(48)^Din(9)^Din(48);
Dout(49)=NS(8)^NS(28)^NS(47)^Din(10)^Din(49);
Dout(50)=NS(7)^NS(27)^NS(46)^Din(11)^Din(50);
Dout(51)=NS(6)^NS(26)^NS(45)^Din(12)^Din(51);
Dout(52)=NS(5)^NS(25)^NS(44)^Din(13)^Din(52);
Dout(53)=NS(4)^NS(24)^NS(43)^Din(14)^Din(53);
Dout(54)=NS(3)^NS(23)^NS(42)^Din(15)^Din(54);
Dout(55)=NS(2)^NS(22)^NS(41)^Din(16)^Din(55);
Dout(56)=NS(1)^NS(21)^NS(40)^Din(17)^Din(56);
Dout(57)=NS(0)^NS(20)^NS(39)^Din(18)^Din(57);
Dout[58:63]=NS[19:14]^NS[57:52]^Din[0:5]^Din[19:24]^Din[58:63];
Dout(58)=NS(19)^NS(57)^Din(0)^Din(19)^Din(58);
Dout(59)=NS(18)^NS(56)^Din(1)^Din(20)^Din(59);
Dout(60)=NS(17)^NS(55)^Din(2)^Din(21)^Din(60);
Dout(61)=NS(16)^NS(54)^Din(3)^Din(22)^Din(61);
Dout(62)=NS(15)^NS(53)^Din(4)^Din(23)^Din(62);
Dout(63)=NS(14)^NS(52)^Din(5)^Din(24)^Din(63);
```

FIG.4
CONTINUED

SCRAMBLER POLYNOMIAL 1+X(39)+X(58)

Dout(19)=NS(19)^NS(38)^Din(19)

SCRAMBLED OUTPUT FOR CURRENT CLOCK PERIOD (TIME=t)



TO FIG.5B

FIG.5A

FROM FIG.5A

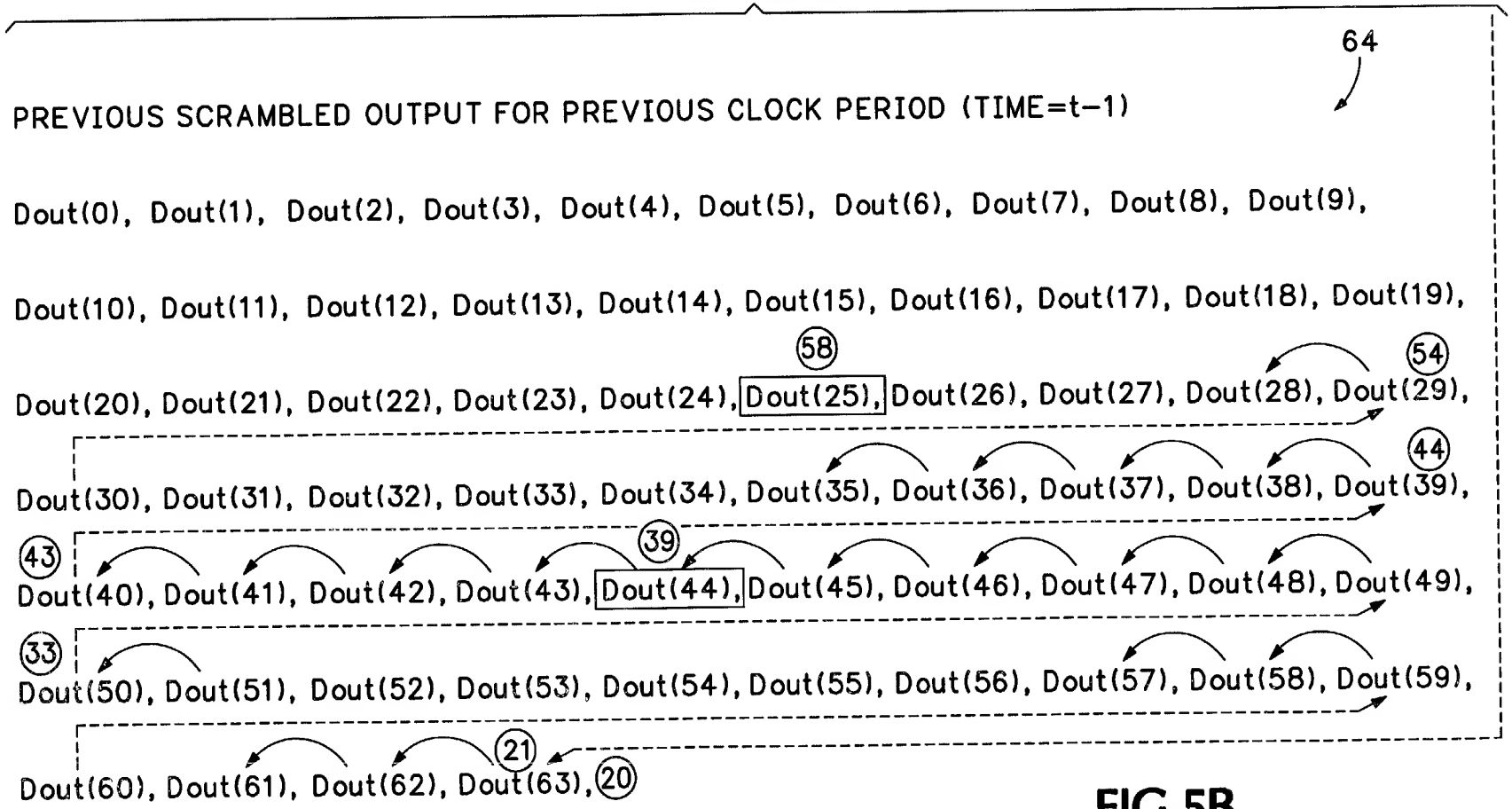


FIG.5B

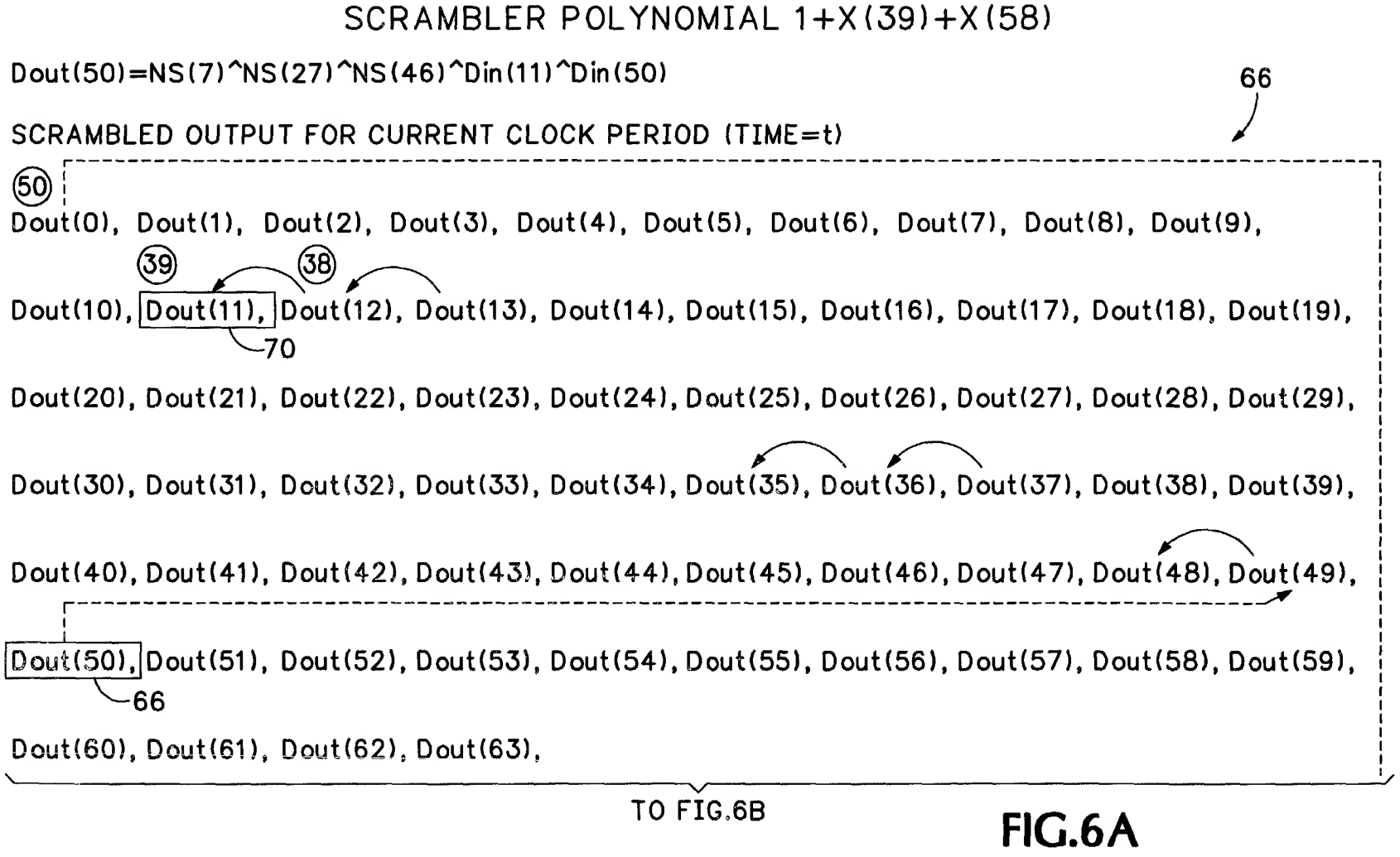

SCRAMBLER POLYNOMIAL 1+X(39)+X(58)
Dout(50)=NS(7)^NS(27)^NS(46)^Din(11)^Din(50)
66
SCRAMBLED OUTPUT FOR CURRENT CLOCK PERIOD (TIME=t)
50
Dout(0), Dout(1), Dout(2), Dout(3), Dout(4), Dout(5), Dout(6), Dout(7), Dout(8), Dout(9),
39
38
Dout(10), Dout(11), Dout(12), Dout(13), Dout(14), Dout(15), Dout(16), Dout(17), Dout(18), Dout(19),
70
Dout(20), Dout(21), Dout(22), Dout(23), Dout(24), Dout(25), Dout(26), Dout(27), Dout(28), Dout(29),
Dout(30), Dout(31), Dout(32), Dout(33), Dout(34), Dout(35), Dout(36), Dout(37), Dout(38), Dout(39),
Dout(40), Dout(41), Dout(42), Dout(43), Dout(44), Dout(45), Dout(46), Dout(47), Dout(48), Dout(49),
Dout(50), Dout(51), Dout(52), Dout(53), Dout(54), Dout(55), Dout(56), Dout(57), Dout(58), Dout(59),
66
Dout(60), Dout(61), Dout(62), Dout(63),
TO FIG.6B

FIG.6A

FROM FIG.6A

68

SCRAMBLED OUTPUT FOR PREVIOUS CLOCK PERIOD (TIME=t−1)

Dout(0), Dout(1), Dout(2), Dout(3), Dout(4), Dout(5), Dout(6), Dout(7), Dout(8), Dout(9),

Dout(10), Dout(11), Dout(12), Dout(13), Dout(14), Dout(15), Dout(16), Dout(17), Dout(18), Dout(19),

Dout(20), Dout(21), Dout(22), Dout(23), Dout(24), Dout(25), Dout(26), Dout(27), Dout(28), Dout(29),

Dout(30), Dout(31), Dout(32), Dout(33), Dout(34), Dout(35), Dout(36), Dout(37), Dout(38), Dout(39),

Dout(40), Dout(41), Dout(42), Dout(43), Dout(44), Dout(45), Dout(46), Dout(47), Dout(48), Dout(49),

71 58

Dout(50), Dout(51), Dout(52), Dout(53), Dout(54), Dout(55), Dout(56), Dout(57), Dout(58), Dout(59),

51

Dout(60), Dout(61), Dout(62), Dout(63),

FIG.6B

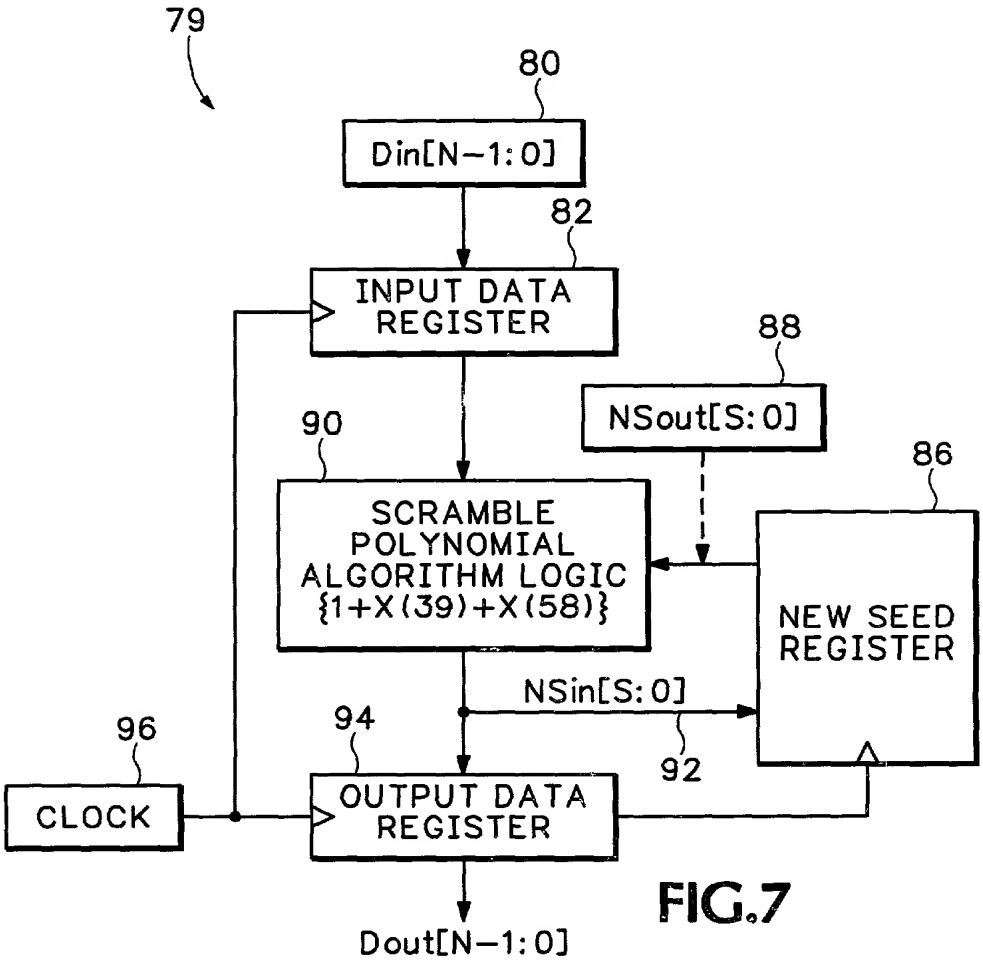

79
80
Din[N−1:0]
82
INPUT DATA REGISTER
88
NSout[S:0]
90
86
SCRAMBLE POLYNOMIAL ALGORITHM LOGIC {1+X(39)+X(58)}
NEW SEED REGISTER
NSin[S:0]
92
94
96
CLOCK
OUTPUT DATA REGISTER
Dout[N−1:0]

FIG.7

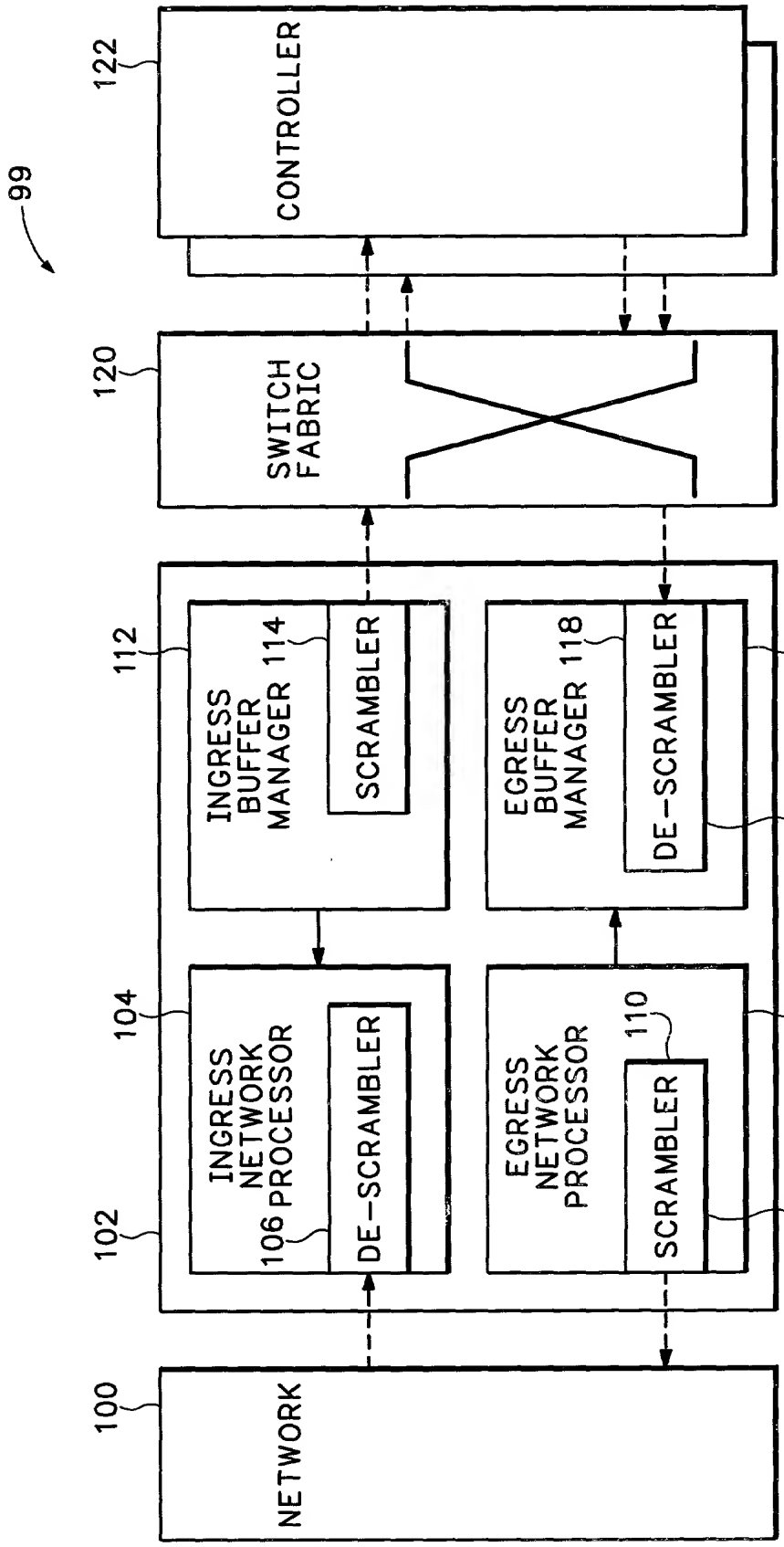

99
122
CONTROLLER
120
SWITCH FABRIC
112
INGRESS BUFFER MANAGER 114
SCRAMBLER
EGRESS BUFFER MANAGER 118
DE-SCRAMBLER
116
SCRAMBLER FOR BACK PLANE CONNECTIVITY
104
INGRESS NETWORK PROCESSOR 106
DE-SCRAMBLER
EGRESS NETWORK PROCESSOR
110
SCRAMBLER
108
SCRAMBLER FOR NETWORK INTERFACE
102
100
NETWORK

FIG.8